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THESIS

**THE FRENCH AEROSPACE AND DEFENSE
INDUSTRIES: CHANGING DYNAMICS OF
PROCUREMENT AND CONSOLIDATION**

by

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June, 1998

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CHANGING DYNAMICS OF PROCUREMENT
AND CONSOLIDATION**

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Submitted in partial fulfillment
of the requirements for the degree of

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ABSTRACT

France's traditions of national sovereignty and its global status as a "great power" help to explain its investment in an independent and autonomous armaments industry. The resulting capabilities, ranging from fighter aircraft to nuclear weapons, have helped to ensure the position of France as a leading nation during the latter half of the twentieth century. Overcoming the inherent problems associated with state control and oversight of the means of production, France has developed a robust manufacturing capability and has produced, among other systems, technologically advanced designs in combat aircraft (the Rafale fighter), space rocket launchers (the Ariane 5 launcher), and remote sensing satellites (the Helios military satellite). However, the need to continue incorporating modern, expensive technology into French systems in the face of budgetary cutbacks has brought the future viability of autonomous and French-led programs into question. As a result, France and other major European nations have tried to find a common solution to consolidate each country's aerospace and defense firms into one corporate entity that could compete effectively against the United States. However, problems rooted in maintaining national capabilities, especially in France, have kept this design from becoming a reality.

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EXECUTIVE SUMMARY

A central tenet of France's strategic culture, especially in the last five decades, has been its continued devotion toward the maintenance of "grandeur" and preserving France's status among the leading nations of the world. A key element within this equation has been continued support for an independent capability to manufacture armaments, including nuclear weapons. In the majority of their weapons development and production programs, the French have emphasized incorporating the most advanced technology available. However, within the aerospace sector, the French procurement process has been affected by several factors that have reduced its efficiency and productivity: a complex state bureaucracy, multi-year budgetary and planning shortfalls, and the continuing question of state ownership of industries.

In the post-Cold War years, new weapons programs targeted at exploiting advanced technology have been undertaken by the French as a means to maintain their global position. These programs are intended to gain commercial and military advantages for France in combat aircraft, space launching systems, and military intelligence satellites. Examples of these initiatives include the Rafale fighter, the Ariane-5 launcher, and the Helios intelligence satellite programs. Throughout the development of these programs, the French government has remained central to the procurement process.

As decreased national defense budgets and reductions in worldwide spending on arms have limited the market for defense and aerospace industries, interest in reorganizing the French aerospace and defense establishment has increased. Moreover, as other European nations such as Great Britain and Germany have discovered, the need for

a European-wide consolidation has arisen within the aerospace sector, especially in the wake of the rapid and extensive restructuring of firms in the United States. However, recent attempts to promote a general consolidation have been hampered by France's continued monopoly of control over its defense industries. Despite several recent institutional mergers and the reallocation of some of the French government's majority shares, companies like Aérospatiale and Thomson remain key components within a "France first, Europe later" policy aimed at supporting French national goals over more European ideals.

To compete with Boeing, their main American competitor, the major European aerospace firms within the Airbus consortium (Great Britain, France, Germany, and Spain) have elected to form a Single Corporate Entity to seek greater efficiencies in civilian aircraft design and production. However, some national firms such as British Aerospace have expressed a desire to develop a truly all-European aerospace defense corporation that would centralize all elements of arms manufacturing. To date, France has opposed such an ultimate merger solution, due to its desire to maintain its own level of influence within the markets that it now dominates (space systems, helicopters, missiles, and satellites). France also has insisted that the type and extent of corporate ownership (either private or public) should not be a prerequisite for the establishment of any European defense entity. As a result, a power struggle has ensued between the various elements that support privatization (British Aerospace and Daimler-Benz Aerospace) and those favoring aspects of state control (the French government and Aérospatiale). Aerospace corporations from outside the traditional grouping of European manufacturers,

including defense firms from Italy and Sweden, have expressed an interest in joining any future attempt at a consolidated European defense corporation.

To preserve its close relationship with the United States in future research and development projects, particularly with regard to sensitive technologies, the British government has suggested that, while it may work to foster a European consolidation, with or without the French, it will not renounce its links to the Americans. In light of potential British (and German) efforts to collaborate independently with defense firms in the United States, the potential exists for France's technological isolation and the loss of its current dominance in weapons programs within Europe. Moreover, the establishment of several differing levels of advanced technology in defense equipment, owing to a European-American divergence in investments in R&D and modernization, could threaten the long-term cohesion of the Atlantic Alliance.

I. INTRODUCTION

Throughout the last two centuries of its existence as a nation, France has generally been faithful to a central tenet of its strategic culture: the continued maintenance of its national standing as a “great power.” This tenet has permeated the fabric of French society to such a degree that it has become a part of its essence and therefore has influenced the way in which national policy has been determined.¹ The concomitant priority attached to the national production of arms has continued to affect the strategic culture of France, especially in terms of the procurement of weaponry based on the use of advanced technology. The chief agent of change that has facilitated the growth and development of the French defense establishment over the last three decades has been the French government, which has exercised its control through its bureaucracy and its partly command-based economy.

However, as the final years of the twentieth century come to a close, France and its national defense industry have become embroiled within a new structural element of European defense and security policy. Where once a complex arrangement of marriages between the royal families of Europe held together the strands of peace, now an

¹ This is the author’s own general definition of strategic culture. For defense procurement, Kolodziej links the manufacturing and selling of arms to French security, but stops short of defining a French strategic culture for procurement. He does illustrate that French arms production has been a key factor in contributing to national independence, strategic military autonomy, and economic growth. Edward A. Kolodziej, *Making and Marketing Arms: The French Experience and Its Implications for the International System* (Princeton: Princeton University Press, 1987), 54.

interwoven fabric of national governments and corporate entities provides the basis for a growing percentage of France's defense structure. Decisions as to which weapon system to procure and where to build its components affect not only forces in France, but also those in Germany, Great Britain, and the United States, as well as a multitude of corporate boards and common shareholders worldwide. Thus, past issues of French defense procurement that formerly fell within the exclusive purview of national sovereignty, are now subject to the influences of strategic interdependence within Europe and beyond.²

A. THESIS ARGUMENT

This thesis analyzes the role of government control within the French defense establishment at a time when technology has emerged as the driving force behind the evolution and development of advanced weapon systems. As budgetary resources have decreased in recent years, the cost of procuring modern armaments has increased due to the complexity of the technology involved in their design. Other financial costs, including the need for higher levels of research and development and the use of automated production techniques, have caused the price per unit of each weapon to soar. Initially utilizing a nationalistic approach after the Second World War, France sought to rebuild its shattered defense establishment with support from abroad, especially the United States.³

² Gregory Copley, "How Much Defense Industry Consolidation is Enough?," *Defense & Foreign Affairs Strategic Policy*, July 1997, 6-7.

³ During the time period from 1945 to 1954, when the French withdrew from Indochina, France received about 10 billion dollars in aid from the United States. De Gaulle deplored the need to rely on the Americans for the means to produce armaments,

Later, largely due to political considerations, France undertook to embrace West Germany and began to develop a lengthy series of bilateral procurement projects in the 1950s and 1960s. However, since the Cold War status quo in Europe began to unravel in the 1980s, France has been forced to abandon its traditional approach to procurement and has begun to make the transition toward one based on power-sharing of control among its partners. These cooperative efforts have involved both other governments and their defense firms, especially within the European arena. As the degree of French control has been reduced, political and economic concerns within France have arisen, as long-held ideological aspects of Gaullism, in particular those surrounding the independent and autonomous nature of the nation, have conflicted with the need to maintain the domestic “safety net” of the people. Efforts to incorporate France into an integrated Europe, including the creation of multinational industrial groups to deal with procurement, have only magnified the problems surrounding defense procurement within France.

B. METHOD OF ANALYSIS

To determine the role of the government within the French procurement process, this thesis will examine the government’s efforts to control the development of defense programs, including corresponding budgets. A summary of the economic forces that have influenced the traditional French method of building arms will be presented in order to show how the state has become so prominent in the process, especially in matters such as

but endured this burden until France was able to achieve financial and technical independence and could then proceed alone. Edward Kolodziej, *Making and Marketing of Arms*, 41-45.

ownership and unemployment, as overall defense spending has decreased. Next, three case studies involving French weapons and space systems will be analyzed in order to determine levels of government control over each project as it progressed from creation on the design board to efforts at series-production. These cases include the Rafale fighter program, the Ariane family of launcher programs, and the Helios/Horus military satellite initiatives. Within each case study, the French efforts to maintain control by the government over aspects of technology will be examined to illustrate how programs that often bordered on the brink of cancellation were continued, all in the name of preserving French interests and meeting national requirements. Additionally, the efforts to achieve consolidation and privatization within the French defense establishment will be reviewed. These include the attempts by the government to promote the merger of Aérospatiale with Dassault and to create a “new” privatized Thomson electronics company from components of several French defense firms. Lastly, the efforts to integrate France within the European defense establishment, along with several initiatives to form a multinational procurement organization, will be studied in the context of recent American mergers and consolidations within the defense and aerospace sector. Finally, some conclusions concerning the future of the French procurement process and the levels of continuing government control will be drawn, including France’s probable role within a consolidated European defense and aerospace establishment.

In the three case studies (Rafale, Ariane 5, and Helios/Horus), six general indicators were used to assess the political and economic roles of the French government. These indicators were (1) the degree of French “control” of the project, (2) the degree to

which the system was built to French technical standards, (3) whether the work on each program directly supported French defense industries, (4) whether an aim of the program was to reduce the level of dependence on American technology or to build up an equal level of French technology to compete with or match U.S. technology, (5) the extent to which technological “expansion” took place as projects got more complex (and expensive), and (6) the amount of developmental time for each program.

II. BACKGROUND

A. NATIONALISM AND AUTONOMY

Rooted within France's historic past, the French desire to maintain its relative status as one of the “great powers” of the world has become an intrinsic element in its national culture. For the French, the symbolic references to their current power – their possession of nuclear weapons, their permanent seat on the UN Security Council, and their continued global presence territorially around the world – are reminders to other nations of France's “grandeur,” or status. The modern advocate of this particular sense of self-awareness transformed into national pride was General Charles de Gaulle, who remarked that “France cannot be France without *grandeur*.”⁴

In the continued pursuit of its efforts to uphold its status among the “great power” nations of the world, France has also considered a high level of national self-reliance in the acquisition of weapons and advanced technology to be a key element within its overall strategic policy.⁵ Although the Gaullist tradition following the Second World War can be seen as the latest example of French independent action, an ability to produce arms indigenously has been pursued for several centuries. For many in France, the precepts of Gaullism seemed to represent the ability of the nation to exert control over its own future

⁴ De Gaulle cited in David S. Yost, “France,” in Douglas J. Murray and Paul R. Viotti, eds., *The Defense Policies of Nations: A Comparative Study*, (Baltimore: John Hopkins University Press, 1994), 236.

⁵ Yost, “France,” 237.

destiny. By the end of the 1950s, a decade marked by unsuccessful colonial wars and the humiliating withdrawal from Suez in 1956, the French resolved to break their technological dependence on the United States by endeavoring to provide France with the military means, including nuclear weapons, to dictate its own strategic terms throughout the world.⁶ This desire for a sense of “national independence” was illustrated by one of the chief architects of the French nuclear program, General Lucien Poirier, who declared, “I belong to the generation of those who say ‘never again.’ ...”⁷

The symbol of sovereignty of an independent nuclear weapons program served to highlight France’s renewal of status. By the early 1980s, the French defense industry was supplying over 96 percent of the required weaponry for France and had established a broad production base.⁸ Advanced weapons were made for the French military (and for export abroad) to French technical standards by French workers. For some in France, a sophisticated arms establishment reinforced the nation’s status, demonstrated its economic vitality, and illustrated through the quality and diversity of its armaments the current extent of French technical superiority. Additionally, due to the relatively small number of domestically-purchased arms bought each year, the French defense industry

⁶ The determination to enhance France’s status in relation to the United States and the Soviet Union was a key factor in the birth of the French nuclear weapons program. *Ibid.*, 237.

⁷ General Lucien Poirier made these comments concerning the fall of France in 1940 to the Germans and the loss of face in Suez a decade and a half later. Diego A. Ruiz Palmer, *French Strategic Options in the 1990s*, Adelphi Papers, no. 260 (London: International Institute of Strategic Studies, Summer 1991), 15.

⁸ Ruiz Palmer, *French Strategic Options in the 1990s*, 40.

has been forced to rely on exports to finance its operations, especially in terms of recouping the cost of technical research and development (R&D) for both military and civilian programs.⁹

B. THE ROLE OF THE STATE

In light of the potential for financial problems associated with expensive new designs in weapons development, the French defense industry became increasingly concerned over the rising costs of its programs, especially the so-called “national” ones involving the applications of advanced technology. To resolve these dilemmas of rising costs, France in the 1960s turned to the one institution that has always provided a sense of order and priorities: the national government. Therefore, expanding the role of the national government and the bureaucracy that supported it by increasing the powers of the executive branch under the President was seen as a beneficial outcome of the constitutional reforms of the French Fifth Republic. Three examples of how the French strived to enshrine this new power of governmental control over the manufacturing of armaments are noteworthy: the formation of the Délégation Générale pour l’Armement (DGA), the *lois de programmation militaire* (a series of multi-year defense plans), and

⁹ This need to sell abroad has been termed the “export imperative” by many French analysts. Through the mid-1980s, technology-driven companies such as Dassault were deriving between 50 and 70 percent of their sales from exports to offset periods of slow domestic spending. U.S. Congress, Office of Technology Assessment, *Lessons in Restructuring Defense Industry: The French Experience - Background Paper*, OTA-BP-ISC-96 (Washington DC: U.S. Government Printing Office, 1992), 7-8.

the promotion of “national champions” within the primary sectors of the French defense establishment.¹⁰

1. The Bureaucracy of the State — DGA

The DGA was founded in 1961 by de Gaulle to consolidate the limited resources of the state and to shift the authority for military procurement away from the individual services. Essentially, the DGA combined all the career workers, scientists and military officials within its state-run system of directorates, labs, arsenals, and shipyards. Its tasks were (1) to manage the development and production of equipment for the French armed forces and for export, (2) to certify acceptable technical performances and costs, (3) to supervise the state-run firms and guide the nationalized companies, and (4) to ensure the long-term health of the French defense industry and to adapt it to the overall needs of the French state.¹¹ The new bureaucracy was designed to provide oversight for the process in order to achieve the maximum possible benefits. Furthermore, the French have seen the arms industry more as a process to support technological innovation and scientific discovery than as simply the means to make products. This concept has led to problems

¹⁰ The DGA was originally known as the Délégation Ministérielle pour l'Armement. (Kolodziej, *Making and Marketing Arms*, 240-241.) France's decision to support the “national champions” concept has been criticized as perpetuating protectionism by supporting domestic arms producers under the guise of national security. (Ibid., 218-219.)

¹¹ Office of Technology Assessment, *Lessons in Restructuring Defense Industry*, 11.

with production efficiency as weapons have begun to “grow” in complexity as new modifications are proposed and made during the actual design process.¹²

In contrast to the armament bureaucracies of its Western counterparts in Great Britain, Germany, and the United States, the DGA is very large and complex. Due to its size, high levels of inefficiency in the use of resources have developed, primarily as a result of the two conflicting internal roles of the DGA: a buying agent and an oversight manager for the French government. The DGA submits the technical specifications to industry and is supposed to ensure quality control over unit production, but often it acts more as a promotional agent than as a quality control monitor for various industrial sectors, supporting their need to “maintain” the diverse French industrial base. This pattern stands in stark contrast to the DGA’s recent efforts to eliminate areas of inefficiency within the overall defense procurement system that might result in long-term cost reductions.¹³ However, despite these efforts at cost-cutting, the DGA has remained a unique symbol of government intervention on behalf of the state. The recent efforts are paradoxical in that the DGA aims to bring about a consolidation of resources and a tighter

¹² Kolodziej, *Making and Marketing Arms*, 214-215.

¹³ In recent years under its current chairman, Jean-Yves Helmer, the DGA has attempted to cut program costs by negotiating multi-year buys of equipment in return for 10 percent reductions in the total overall price. The DGA reported savings of Ffr 30.3 billion on 81 ongoing weapons programs in 1997. It also reduced its own internal operating costs in 1997 by 14 percent from Ffr 7.7 billion to Ffr 6.6 billion. Giovanni de Briganti, “France Stems Arms Funding Gap,” *Defense News*, 26 January - 01 February 1998, 6.

focus in production by adding layers of decision-making and oversight to the French industrial establishment.

2. The French Programming Laws

The multiple *lois de programmation*, or programming laws, have served as long-range planning tools for use as a “blueprint” for the future, but often their broad scope has not accurately reflected the fiscal reality of the annual French budgets. Prepared sometimes without sufficient regard for current circumstances, the programming laws are constructed by the Prime Minister and his cabinet, but often do not receive adequate funds as part of the annual French defense budget. Unlike their American counterparts, the two chambers of the French legislature exert a much less effective degree of financial oversight (the power of the purse) than does the U.S. Congress. The chief “power brokers” within the French defense budget process have become the various government ministers, rather than the members of the Senate and National Assembly. It is to these ministerial offices that aggrieved French labor leaders and other lobbyists proceed in hopes of seeking to alter policies affecting the defense industry and its annual budget. Thus, driven by the executive forces at the top, most French defense budgets encounter little resistance in being approved into law.¹⁴

Despite their lack of adequate fiscal support, major programs are allowed to continue with limited “developmental” costs which are orchestrated by reducing the

¹⁴ Rolf H.W. Theen and Frank L. Wilson, eds., *Comparative Politics: An Introduction to Seven Countries*, 3d ed., (Upper Saddle River, N.J., Prentice-Hall, 1986), 116-117.

number of units that the government will ultimately buy or by stretching out the entire procurement program for years past the originally planned incorporation date. In addition, new French governments have not felt obliged to uphold and continue the long-range plans of their predecessors in terms of equipment buys or force modernization deals, thereby reducing the possible overall effectiveness and potential savings which might be derived from strategic defense planning. Overall, due to real uncertainties about the probability that a constant source of government funding will be available (through the signing of long-term contracts), most French aerospace companies, like Dassault, Aérospatiale, and Matra, have had a difficult time undertaking new technology-driven projects that require extensive amounts of R&D funding and extended series-production.

3. Ownership and Control of Industry

The naming of “national champions” for each sector of French defense was initiated in order to achieve consolidation within the industry. Control over procurement was regained by producing large economic units that could effectively compete with the American defense firms and reconquer domestic French markets from foreign competitors. The process also allowed larger amounts of resources to be combined in order to meet the rising costs of research, especially within the high technology areas of each sector.¹⁵ However, by 1990 the effects of emphasizing nationalistic principles of

¹⁵ Kolodziej, *Making and Marketing Arms*, 217. Unfortunately, this gap in funding R&D between the U.S. and Europe has grown larger over time. In recent years, the U.S. has outspent all of its allies in Europe by a factor of five to one. (Secretary-General of NATO, Javier Solana, speech presented at SACLANT Seminar, Lisbon, Portugal, 4-5 May 1997.)

self-reliance in all types of advanced weapons had pushed the French procurement process to the brink of collapse, to the extent that one Foreign Ministry report suggested, “France no longer has the financial means for complete technological independence.”¹⁶ It also recommended that measures be taken to enhance competitiveness and to select sectors within the defense establishment with a view to preserving their high technical content and the country’s strategic independence.¹⁷

The strategic aspects of France’s defense procurement process have also been influenced by economic factors in recent years, especially as its annual budget outlays have decreased. In arms procurement matters, the French economy essentially has been based on a “command” style model, similar to that utilized by the Soviet Union. The French state has controlled the majority of the factors of production: it has acted as the buyer, the seller, the facilitator, and the overseer. The majority of the defense-oriented companies within the French production establishment are either state arsenals, state-owned organizations, or semi-private firms that are state-controlled (through government control of voting shares within the corporate board). A private firm is answerable to its shareholders to explain yearly profits or losses. With a state-owned company, the government controls the decision-making process but also is accountable for losses, which must be made up through the use of subsidies.¹⁸ Inside a “command” system,

¹⁶ Ruiz Palmer, “French Strategic Options,” 42-43.

¹⁷ Ian Davidson, “France’s Defence Procurement ‘Must Go High-Tech’,” *The Financial Times*, 12 March 1990, 4.

¹⁸ Pamela Pohling-Brown, “European Company Statute: Way Forward or Red Herring?,” *Jane’s Defence Industry Report*, February 1998, 8.

unprofitable or inefficient firms have the effect of acting like a dead weight, requiring annual infusions of capital in order to continue operations while employing scores of civil service personnel. Unlike private firms which can downsize their workforces to cut corporate losses, French state-run organizations face a tough dilemma: support the status quo or risk the wrath of the labor unions when job cuts are proposed.¹⁹ Since 1993, the convergence criteria to qualify for the European Monetary Union (EMU) have further limited the budgetary maneuvering options of the French government by imposing debt and inflation limits that affect the amounts of public spending. As the French government has attempted to exercise more control over its defense procurement, it has also been handcuffed by separate economic problems that are associated with domestic politics. For individual French weapons programs in development, whether run alone or in cooperation with other nations, government efforts to maintain control have encompassed economic factors as well as strategic issues concerning the need for independent action.

¹⁹ French unions have been arguing against any further defense cutbacks. According to the unions, the French defense workforce has fallen from 300,000 to 250,000 in the last four years, with an additional 20,000 jobs on the block for 1998. This fact has caused the French Communists to put considerable pressure on the Jospin government. Jac Lewis, "Three French unions join in battle against '98 cuts," *Jane's Defence Weekly* (hereafter *JDW*), 27 August 1997, 19; and Robert Graham, "French Communists threaten jobs revolt," *The Financial Times*, 13 November 1997, 6.

III. THE EARLY YEARS OF FRENCH COOPERATION

Despite their nationalistic reputation, the French have a robust track record in cooperative arm ventures with their allies, including Germany, Great Britain, and the United States, during the last five decades. According to Kolodziej, the French tend to favor bilateral or multilateral development arrangements that have served to promote “the maintenance of a technologically advanced, financially solvent, and internationally competitive arms industry.”²⁰ Furthermore, he has stated, “the task of filling immediate military requirements has been in every case accompanied by the dominant objective of promoting an independent arms production capacity.”²¹ Other motivating factors have included access to new technology in order to aid in the development of weaponry with a commercial advantage, especially in terms of having a potential for future exports (a factor in which the French have long held an interest). Finally, to date most of the cooperative ventures into which the French have entered have tended to emphasize a co-equal or dominant role for France with respect to its other partners. Being in a dominant relative position (both financially and later in series-production) has allowed France the advantage of dealing with other nations from a position of strength.²² Historically, by exerting a controlling influence over a project, France has been able to act as the program system integrator, thereby allowing it to gain access to all relevant technology and to

²⁰ Kolodziej, *The Making and Marketing of Arms*, 152.

²¹ Ibid.

²² Ibid., 152-153.

maintain a commercial advantage for its chief industries in terms of downstream production work involving French jobs at home.

A. FRANCO-GERMAN COOPERATION

Beginning in the mid-1950s through the present, France has maintained a close collaborative relationship with Germany in terms of cooperative weapons programs. As an element of the accords in 1954-1955 that brought the German armed forces and the German defense industry back into being following the Second World War, France began a strategic program to “embrace” its “hereditary enemy,” partly to promote reconciliation and partly to monitor and influence its armaments activities. During the 1950s and 1960s, Germany and France worked together on a variety of weapons programs, with some (the Milan, HOT, and Roland missile and the Alpha-Jet trainer programs) more successful than others (the Transall and Atlantique aircraft programs).²³ The Transall aircraft program was a noteworthy case in point, because while the transport plane was eventually produced by both nations, it really never truly satisfied the requirements of either one. The hybrid aircraft suited France’s need for a long-range, large-cargo capacity aircraft to a greater degree than Germany’s requirement for a transport that possessed short field takeoff and landing (STOL) characteristics.²⁴ By the 1970s and 1980s, the relationship

²³ Since the 1960s, Germany and France have also worked together on the Ariane launcher program as well as other missile and submunition efforts like those for the Multiple Launch Rocket System (MLRS). David S. Yost, “Franco-German Defense Cooperation,” in Stephen F. Szabo, ed., *The Bundeswehr and Western Security* (London: Macmillan, 1990), 224-225.

²⁴ The final design was 120 percent over its original budget, took twice as long to complete as was initially planned, and resembled the competing American C-130 aircraft

between the two nations had cooled considerably. West Germany declined to purchase French-made combat aircraft and opted for other sources of supply, chiefly joint ventures with the British and the Italians (Panavia Tornado and European Fighter Aircraft) and the Americans (F-104 and F-4).²⁵ The only major cooperative venture that currently exists within the aerospace military sector that involves the French is the ongoing work surrounding the Eurocopter-based Tiger attack helicopter program.²⁶ In general, the Franco-German efforts were seen by the French as building the technological basis for a more prosperous Western European arms establishment, while the Germans felt that the French enjoyed the benefits of German financing for demanding, expensive projects that aimed to improve France's sense of grandeur (and ease its own spending on nuclear programs).²⁷

more than the Luftwaffe wanted. Kolodziej, *The Making and Marketing of Arms*, 157.

²⁵ According to French sources, German ill feelings over the termination of the Franco-German-Italian cooperative efforts involving nuclear matters in the late 1950s led to West Germany dropping plans to work on a Franco-German tank design (and building the Leopard I instead) and purchasing the F-104 over the French Mirage III. German views may have been that the proposed program favored French manufacturing interests more than German ones. François Puaux, "La France, l'Allemagne et l'atome: discorde improbable, accord impossible," *Défense Nationale*, December 1985, 11-12, cited in Yost, "Franco-German Defense Cooperation," 224.

²⁶ The Tiger attack helicopter cooperative effort dates back to the mid-1980s. Two versions have been approved for initial series-production: an anti-tank model and a ground support version. Germany and France will each buy 80 helicopters and the aircraft will be built on two separate production lines. Lucy Smy, "Tiger Helicopters: Bonn, Paris confirm orders," *Financial Times*, 01 May 98, 8.

²⁷ Yost, "Franco-German Defense Cooperation," 226-227.

B. FRANCO-BRITISH COOPERATION

British-French cooperative efforts have spanned a variety of programs ranging from successful helicopter efforts (Puma, Gazelle, and Lynx), through mildly prosperous ventures in missiles (Martel), to troubled programs like the Jaguar and Concorde jet aircraft.²⁸ Britain and France differed over the technical specifications for the Jaguar. Dassault was rather lukewarm about supporting a program that enhanced the viability of its troubled competitor, Bréguet, and that promoted a rival to its own Mirage series. According to most experts, the Concorde was a technical innovation but a commercial disaster that ultimately was bought and flown by British Airways and Air France only at greatly subsidized cost.²⁹

C. FRANCO-AMERICAN COOPERATION

As earlier noted, American financial and military assistance following the Second World War helped to rebuild the domestic French arms industry in the late 1940s and early 1950s. American aircraft (F-100s) loaded with air-dropped bombs were provided to France for nuclear support missions in the 1960s.³⁰ The French and other European

²⁸ All three types of helicopters have been widely exported. Martel SAM production was limited to the two major production nations. Kolodziej, *Making and Marketing of Arms*, 153-154.

²⁹ The SPECAT Jaguar program was ultimately transferred to Dassault when it merged with Bréguet under French government pressure. Sixteen Concorde were ultimately produced. Cost overruns were nearly four times the original estimate for the Concorde. *Ibid.*, 159.

³⁰ The 68 aircraft were armed with U.S. B28 gravity bombs and based out of Lahr and Bremgarten, Germany in 1961-1966 as part of the U.S. military assistance program. Paul Jackson, *French Military Aviation* (Leicester, U.K., Midland Counties Publications, 1979), 23, cited in Robert S. Norris, Andrew S. Burrows, and Richard W. Fieldhouse,

nations produced a licensed version of the Hawk SAM system under NATO arms agreements.³¹ When the French pulled out of the integrated military structure of NATO in 1966, the relationship with the U.S. became chilly for a few years. However, President Richard Nixon and his national security advisor, Henry Kissinger, initiated efforts in 1969 to improve U.S. relations with France. By the mid-1970s, several “official” and “unofficial” meetings between the Americans and French had taken place. Former French President Valéry Giscard d’Estaing has indicated that the French received assistance from the Americans to update the capabilities of their nuclear warheads using elements of imported technology. Some of these improvements included aid in developing, miniaturizing, and hardening French multiple independent reentry vehicles (MIRVs). However, the President asserted that the independent and autonomous nature of the French deterrent was never compromised as a result of these bilateral agreements.³² Recent cooperation has occurred between the two nations on rocket motor design (from Ariane) and has led to French purchases of specialized electronic surveillance aircraft (AWACS E-3 and Hawkeye E-2C) for their armed forces.

Nuclear Weapons Databook: Volume V British, French, and Chinese Nuclear Weapons (Boulder: Westview Press, 1994), 189.

³¹ The other nations in the consortium were Italy, West Germany, the Netherlands, and Belgium. Kolodziej, *Making and Marketing of Arms*, 153.

³² Valéry Giscard d’Estaing, *Le Pouvoir et la vie*, vol. 2, *L’affrontement* (Paris: Éditions Compagnie Douze, 1991), 183-191, cited in Yost, “France,” 245. Additionally, it has been reported that a secret 1978 accord allowed the transfer of state-of-the-art supercomputers from the U.S. to France for civilian use. These computers might have ended up in the French nuclear weapons and aerospace development programs. Norris et al., *Nuclear Weapons Databook*, 194.

IV. THE RAFALE FIGHTER PROGRAM

As part of its efforts to build its own independent armaments industry, France has always emphasized the role of combat aircraft as symbols of its status as a technologically superior nation. France has therefore nurtured and supported its domestic aircraft industry, which by the late 1970s was solely concentrated within one company: Dassault Aviation, following its merger with Bréguet. The Rafale is the latest in a long line of combat aircraft belonging to the Mirage series begun in the 1960s. These have included the Mirage III, Mirage V, Mirage 2000, and Mirage 2000-5 fighter programs. Besides the economic need to promote and sell combat aircraft abroad, France has also utilized the transfer of its advanced technology in the form of Dassault's fighters as part of its foreign policy. These initiatives have illustrated France's desire to position itself as an alternative to the United States as a global supplier of arms with fewer restrictions attached concerning their introduction, especially in some areas of the Middle East, where France has sought a broader degree of diplomatic access.³³

The origins of the Rafale will forever be linked with those of the European Fighter Aircraft (EFA), which later became known as the EuroFighter 2000 (EF-2000), since they grew out of the same initial design but later diverged into two separate and rival

³³ France sold Mirage F1s and “leased” Super Etendards to Iraq in the 1980s to assist the country in its war with Iran. These aircraft were Exocet-capable. Kolodziej, *The Making and Marketing of Arms*, 104-105. The French also sold Mirage IIIs (and missile patrol boats) to Libya in several batches throughout the 1970s and 1980s, even while Paris was supporting direct efforts to oust Libyan forces from Chad in the 1980s. (*Ibid.*, 357-363.)

programs. Great Britain, Germany, and Italy began the initial EFA program in 1982, and were joined by France and Spain in 1983. The chiefs of staff of all five countries met together in December 1983 and agreed in principle on the basic technical features of the aircraft. However, this meeting probably marked the “high-water mark” of the EFA joint venture as subsequently several conflicts arose among the countries involved on behalf of their national aerospace firms, especially in the cases of Britain and France.

The chief issues of contention centered on four factors: (1) which country would lead the aircraft design team, (2) the selection of an aircraft engine, (3) the amount and percentage of work that each nation would receive, and (4) the weight of the aircraft. The basic arguments surrounded the French need to control the overall design effort for Dassault (as opposed to British Aerospace) and the selection of the French firm SNECMA’s M-88 engine over its rival Rolls Royce and its RB.199 engine.³⁴ The overall aircraft weight was important since a lighter aircraft (French preference) would hold down production costs, support later export abroad, and allow for its use as a multirole carrier aircraft by the French Navy. A heavier aircraft would have an increased range and a larger payload, characteristics which were in line with the British desire for an air superiority fighter to fulfill Britain’s NATO air defense mission. The Germans initially sided with the French due to the need for a lighter, cheaper fighter that could replace their aging F-4 interceptors, but later switched permanently to the British camp due to French

³⁴ This insistence by France was probably centered on efforts to ensure the future profitability of both Dassault and SNECMA. Mark Lorell, Daniel Raymer, Michael Kennedy, and Hugh Levaux, *The Gray Threat: Assessing the Next Generation European Fighters*, MR-611-AF (Santa Monica: RAND, 1995), 38.

intransigence over production quotas and airframe design. Ultimately, in July 1985, the French government withdrew from the EFA consortium and, after a period of inaction, announced its commitment in February 1987 to pursue its own independent fighter development program, which would utilize the Dassault-built Rafale A technology demonstrator aircraft.³⁵

When Dassault began its own independent development process in the late 1980s, the French envisioned the Rafale to be a fighter based on the technology in the U.S.-made F-16, only French-made and more advanced.³⁶ Unfortunately, the cost of developing the necessary technology to raise the Rafale to the superior level that was desired by the French government was more than anticipated. This financial shortcoming was magnified during the early 1990s by cuts in France's defense procurement that reduced the overall number of aircraft to be ordered, thus raising the total price for the whole program toward the Ffr 200 billion (\$34 billion) level.³⁷

Whether in anticipation of the French government's cutbacks in its annual defense orders or due to practical efforts to remain globally competitive, Dassault undertook a

³⁵ Yolande Simon, "Prospects for the French Fighter Industry in a Post-Cold War Environment: Is the Future More Than a Mirage?", RGSD-106 (Ph.D. diss., Santa Monica: RAND, 1993), 8-9, 12-14, 20-22.

³⁶ The Rafale is in the lightweight fighter class and is comparable to the F-16C Block 40 version. The performance data of the Rafale concerning such factors as range and weapons payload actually exceed those of its American competitor. Lorell et al., *The Gray Threat*, 19-20.

³⁷ A 250-page report later released by the Cour des Comptes estimated the total cost of the Rafale program, including penalties, to be Ffr 224 billion (\$38.1 billion). Jac Lewis, "Poor budget control puts French projects at risk," *JDW*, 25 June 1997, 12.

plan to streamline its production and design capabilities in the early 1990s. It closed older plants and consolidated production and test/research facilities at centralized locations. Moreover it continued its long-held policy of subcontracting out a majority of its airframe manufacturing to other French aerospace companies, including subsidiaries of Aérospatiale. Dassault's design focus for the Rafale was to maintain the best possible design team, and advanced research facilities to analyze and flight test the five eventual prototypes.³⁸ Moreover, Dassault was one of the first European aircraft manufacturers to incorporate computer-aided design and manufacturing (CAD/CAM) technology as part of its final assembly capabilities, including complete airframe and systems integration. Using a process known as product data management (PDM), each part of the Rafale is digitized and stored. By overcoming the need for a physical mock-up stage, Dassault's engineers can view the entire aircraft, not just a component. Rapid manipulation of the digitized Rafale database has proved vital in moving the project forward, despite the delays due to budgetary problems.³⁹

Overall, Dassault's small-size efficiency based on new computerized design techniques has allowed it to incorporate a high level of technology, and yet keep the total cost of the Rafale (and other Mirage projects like the Mirage 2000-5 export series) at a

³⁸ Pierre Sparaco, "Dassault Finds Profits Amid Bleak Military Market," *Aviation Week and Space Technology* (hereafter *AW&ST*), 31 May 1993, 85-87.

³⁹ Another advantage of PDM is that it eliminates human error and sets a single-build standard for aircraft like the Rafale. Nick Cook, "France counts the cost of buying the Rafale," *JDW*, 11 February 1998, 26-27.

level similar to that of its fourth-generation fighter counterparts, the EuroFighter 2000, the Block 60 F-16, and the F-22 Raptor.

Despite Dassault's best efforts to persevere within the French state system, the Gulf War illustrated how far the French had fallen below the technological level of the Americans. First, it showed how their primary national defense program for the past thirty years, the independent nuclear arsenal, was irrelevant to such a conflict; it failed either to prevent the war from starting or to assist in bringing it to a conclusion. Second, the successful “debut” of American advanced technology such as military satellites, M1A2 tanks, and F-117 Stealth fighters overshadowed the military effort of France's deployed forces.⁴⁰ France's older and obsolete technology, in the case of the F-8E Crusader naval fighters assigned to the aircraft carrier *Clemenceau*, and France's lackluster modern technology were no match for the dazzling display on CNN of America's capabilities.⁴¹

⁴⁰ Besides a lack of a military intelligence satellite capability, the technological level of France's combat aircraft was also criticized following the war. The only French all-weather attack aircraft, the Mirage 2000Ns, theoretically available for coalition attacks, were undeployable due to their higher nuclear priority. Thus due to a lack of advanced avionics, IFF, and radars, French aircraft were limited to day-only strikes. Francois Heisbourg, “France and the Gulf Crisis,” in Nicole Gnesotto and John Roper, eds., *Western Europe and the Gulf* (Paris: Institute for Security Studies, Western European Union, 1992), 32-33.

⁴¹ In fact the aging 1960s-era Crusaders were so useless that they were not even deployed with the *Clemenceau*, which instead carried helicopters and trucks to the Gulf. The Crusaders were supposed to have been retired back in 1993 but were kept after the government killed a French Navy proposal to lease American F-18s as an interim fix until the Rafale arrived in 1996. Philip H. Gordon, *French Security Policy After the Cold War*, R-4229-A, (Santa Monica: RAND, 1992), 36.

As a result, after the cease-fire in Iraq, France began a program of dedicated defense spending aimed at closing the French-American technology gap.

Finally, due to bureaucratic inefficiency within the DGA and elsewhere in the government, the Rafale's development program was stretched out, in order to save it from cancellation, and the aircraft was delayed from going into series production. The French Navy, which has staked the future of its aviation capability on the Rafale, has been particularly concerned about slippages in the program leading to potentially higher final costs that will stretch its annual budgets to the breaking point.⁴² Various efforts to negotiate some reductions in the price per aircraft by the DGA, including cuts by ten percent, have slightly improved the financial picture of the Rafale program, but at the cost of alienating Dassault. The failure to include the Rafale within several recently announced multi-year contracts, due to misguided efforts to link production to the privatization of Dassault, has also been a hindrance.⁴³ Whatever the final cost, French government and military officials have said that there is no longer any question of scrapping the Rafale or further postponing production, as some members of the Socialist

⁴² The worst case for French Naval Aviation would be to risk eating away at the funds for other equipment programs, notably the third E-2C Hawkeye airborne early warning aircraft that was stipulated to arrive in 2003. Comments by Rear Admiral Paul Habert, Assistant Chief of Staff for French Naval Aviation, "France: Rafale in French Navy's Air Force," *Air & Cosmos/Aviation International*, 30 January 1998, 12 (FBIS-WEU-98-086, 27 March 1998).

⁴³ Other noteworthy multiyear contracts included orders for 500 SCALP-EG cruise missiles worth Ffr 4.5 billion (\$745 million) and 225 Mica air-to-air missiles at Ffr 2.5 billion (\$414 million). Jac Lewis, "France awards \$745m cruise missile contract," *JDW*, 14 January 1998, 3.

party have suggested.⁴⁴ All in all, French government efforts to regain control of the Rafale program (and to an extent Dassault itself) have only resulted in a series of cost overruns and delays in bringing what was once cutting-edge aerospace technology to the marketplace.

⁴⁴ According to General Jean Rannou, Air Force Chief of Staff, “Abandoning the Rafale . . . would be absurd.” Giovanni de Briganti, “Rafale Escapes Audit, Faces French Scrutiny,” *Defense News*, 10-16 November 1997, 4.

V. THE ARIANE 5 LAUNCHER PROGRAM

The Ariane program followed an interesting legacy in European space launches, both successful and dubious. From 1962 to 1967, the French carried out an ambitious experimental ballistic missile program known as the Pierres Précieuses (Precious Stones) project at Hammaguir in the Algerian Sahara. The aim was to develop the technologies necessary for an independent ballistic missile capability.⁴⁵ These tests were followed by an additional series of prototype intermediate range ballistic missiles (IRBM) and submerged SLBM launches from the Landes Test Range (Centre d'Essais des Landes or CEL) and from the newly constructed flight test center at Kourou in French Guyana.⁴⁶ The less-than-successful effort was the costly Europa II launcher program that ended in massive debt in 1973.⁴⁷

Born as a European Space Agency (ESA) project in 1973, the Ariane rocket program got its start as a European attempt to win some independence from the United States in the area of launch services. However, the French at the time felt so strongly in

⁴⁵ Fifty-four R&D missile tests were conducted (47 successfully) at the Hammaguir site, culminating in the 26 November 1965 launch of the 47-kg A1 satellite that made France the third global space power. The Precious Stones series included missiles named Agate, Topaze, Émeraude, Saphir, Rubis, and Diamant. Total program cost was nearly Ffr 1.5 billion. Robert S. Norris et al., *Nuclear Weapons Databook*, 195 and Shirley Compard, “Des ‘Pierres Precieuses’ au M5,” *Revue Aerospatiale*, 1990, 18.

⁴⁶ The Hammaguir site closed in May 1967. Kourou opened in 1970. The first launch from the Landes site over the CEL range (south-westward out over the Atlantic) took place on 15 September 1966. Norris et al., *Nuclear Weapons Databook*, 195.

⁴⁷ The Europa II project began in 1970 and cost around \$1 billion. Chris Bulloch, “Ariane Right on Course,” *Interavia*, August 1978, 731.

favor of the Ariane program that they requested, and ultimately received, authorization for the Centre National d'Etudes Spatiales (CNES) to assume the role of prime contractor, exercising control over the whole project.⁴⁸ Later, the program came under the coordination of the multi-national Arianespace consortium, but essentially it remained a French-controlled operation dominated by the CNES and other French aerospace firms such as Aérospatiale (missile components) and Société Européenne de Propulsion or SEP (engines). Ariane also provided a real boost to Aérospatiale in terms of supporting new levels of production to replace the work lost after the Diamant missile project stopped testing in the mid-1970s.⁴⁹

Designed to oppose the American and Soviet stranglehold on space, the Ariane program served to offset the U.S. Thor and Atlas launch vehicles. It encountered serious opposition from the West Germans during its early years, chiefly surrounding the perceived simplistic level of its French-designed rockets and their lack of general testing.⁵⁰ The initial variant, Ariane 1, spanned eleven launches (with two failures) beginning with its inauguration into orbit on 24 December 1979. Two noteworthy

⁴⁸ Ibid., 731-733.

⁴⁹ By 1978, French companies had obtained 64 percent of the Ariane contract work compared to FRG (20 percent), Belgium (5 percent), and the UK (2.5 percent). The last Diamant test was conducted in 1975 at Kourou. Ibid., 734-735.

⁵⁰ The Germans were also upset by the French insistence on pushing ahead with attempts to sign a contract with the ESA to build the first batch of six production Ariane rockets in December 1977 before even one successful test flight had been accomplished. This was in addition to the rising costs associated with the rehabilitation of the Kourou testing and launch site. Martin Grüner, "The Practical Space Age Begins?," *Interavia*, April 1978, 308-310.

moments were the first commercial flight on 23 May 1984, which launched the Spacenet I vehicle, and the first launch of a remote sensing satellite (SPOT 1) on 22 February 1986. These successes were followed by six Ariane 2 and eleven Ariane 3 lift-offs before the program gave way to the workhorse Ariane 4 series of boosters in 1988.⁵¹

By the late 1980s, the French government saw the need to develop a new, more powerful Ariane booster in order to position Arianespace to continue dominating the global launch market in the next decade. The Ariane 5 launcher would complement the existing Ariane 4 series by providing a heavy-lift vehicle which would expand the company's growing commercial advantage (by allowing a pair of two- to three-ton satellites to be orbited simultaneously) and support future efforts in manned spaceflight (via the Hermes space plane). However, by 1992 the Hermes project was awash in red ink due to huge cost overruns. Combined with sharp cut-backs in funding by the member nations of the European Space Agency (ESA), it threatened other high-profile technology-driven projects like Ariane 5 and the Columbus module for the Freedom space station.

Although it was canceled in 1993, the Hermes program had lasting effects on the Ariane 5 development process. Since Hermes was to be a heavy, manned vehicle, it required an upgrade in the maximum thrust of the upper-stage engine of the Ariane 5 to deal with the increase in overall vehicle weight. The upgrade of the engine forced the

⁵¹ There have been 6 total launch failures over the Ariane 1-4 series with the last one on 24 January 1994. However, despite a brief period when it was grounded due to problems with its third stage engine, the Ariane 4 series (40, 42P, 44P, 42L, 44LP, and 44L) has been very commercially reliable with over 87 successful launches (and two failures). (Arianespace, The European Transportation Company. Online. Available: <http://www.arianespace.com>).

builder, Daimler Benz Aerospace, to redesign some of its components, including the engine's combustion chamber.⁵² This process resulted in program delays and helped to increase the development costs of the vehicle.⁵³ Finally, the first two demonstration flights of the Ariane 5, in 1996 and 1997, resulted in an outright failure (due to a bad guidance component) and a partial failure (due to its satellite cargo being inserted into a less than optimal orbit). These setbacks have caused delays and increased costs.⁵⁴ By the late 1990s, the mixed record of the Ariane 5 program seemed for many to be the weak link in the chain for France's (and to an extent Europe's) strategic access to space.

The French government has undertaken to support two primary positions with respect to the Ariane 5 project: (1) to protect the necessary levels of funding for its development internationally within the ESA and domestically within the CNES, and (2) to maintain Arianespace's large share (nearly 50 percent) of the global space launch market by pushing commercial and, to a lesser extent, human spaceflight interests. To accomplish these apparent goals, France has worked to gain a dominant political position within the ESA and Arianespace, and has loaded its own national firms with Ariane

⁵² The new engine increased its available thrust from 5000 to 6000 lbs. Craig Covault, "Ariane 5 Engine Invigorates German Rocket Propulsion," *AW&ST*, 20 February 1995, 48-49.

⁵³ Other, non-technical elements also led to rising costs. Critics alleged that the managements of CNES and Arianespace failed to hold prime contractors (often French) to stipulated timetables and budgets for Ariane 5. "Ariane 5 'culture' must change," *AW&ST*, 05 August 1996, 74.

⁵⁴ The delay will cost the participating European governments around \$400 million dollars in addition to the \$500 million cost for the four destroyed ESA satellites that were lost. Peter de Selding, "Ariane 5 Launch Clears Path to French Funding," *Space News*, 3-9 November 1997, 1.

contracts. Additionally, it has sought to counter competition from new foreign booster programs which have been seeking to erode its existing market share for launch services. Finally, the French government has attempted to diversify its future Ariane commercial position by offering the Ariane 5 booster as part of its share in joint NASA-European efforts in manned spaceflight.

At ESA meetings in Granada, Spain, in November 1992, the French delegation stated that it could not support long term growth rates on space and sought to reduce its level of funding on the Columbus module. Since previously France had been a vocal supporter of Hermes, other European nations subsequently complained that France was attempting to preserve its dominant overall role in space by ensuring the survival of Ariane 5 at the expense of the U.S.-associated Columbus program. Moreover, other European space officials also suggested that the French actions might be linked to a desire to reemerge in the 1990s as Europe's leader in manned space flight with a future derivative based on Hermes technology.⁵⁵ In retrospect, by late 1992, attempts by the CNES to reduce costs in space programs were not limited to its relations with the ESA, but were also internally oriented as efforts were begun to try to regain control of runaway development costs on the subelements of the Ariane 5 program itself.

⁵⁵ It is interesting to note that Germany (38 percent) and Italy (31 percent) possessed the largest stakes in Columbus and had the most to lose. However, even after cutting its share, France still maintained a 10 percent stake (down from 14 percent) in the module via contracts by Matra Marconi Space. Yet despite the potential for financial loss, the French government sought to extract political concessions from the rest of the ESA partners in order to pursue its own priorities. Craig Covault, "Europe Faces Critical Space Planning Juncture," *AW&ST*, 09 November 1992, 25.

In 1995, over objections from the British, the French government managed to secure the long-term production from the ESA of the first 14 units of Ariane 5 launchers, even though its initial engine testing was barely underway at Kourou and its two planned demonstration launches were as yet unscheduled.⁵⁶ The substantial production contract was seen by many observers as necessary to help in maintaining the capacity of France's space-related industries. The French approach – beginning limited production while simultaneously conducting prototype testing – has been contrasted to the American style of development, which emphasizes building and testing experimental craft to eliminate any potential design flaws before embarking on full-scale production. Historically, the American method has lessened the likelihood that major redesign work will have to be done later if a critical flaw is discovered during prototype testing. Such French efforts to identify and fix technical problems in mid-stream have been named by many critics as one of the root causes of the delays that have historically increased the costs of the Ariane 5 launcher.

In 1997, the French government upset the management at Arianespace by overriding the recommendation of its board of directors. The Space Minister, François Fillon, imposed his choice of Jean-Marie Luton as the new chairman and CEO of the company. Fillon's insistence on nominating Mr. Luton was seen by many observers as an effort to realign the mission and goals of Arianespace toward a more pro-French position.

⁵⁶ Additionally, due to the stoppage of Ariane 5 launching activity, Arianespace approved the purchase of an additional 20 Ariane 4 rockets to tide the company over as it awaits the full introduction of the Ariane 5. Peter de Selding, "Ariane 5 Launch Clears Path to French Funding," *Space News*, 03-09 November 1997, 19.

As one Ariane contractor noted about the decision, “Arianespace is at a crossroads, in a highly competitive market. Fillon’s initiative clearly indicates France’s political desire to dominate Arianespace, although it is a European company jointly owned by shareholders in 12 countries.”⁵⁷

After the Reagan Administration’s decision, following the Challenger disaster in 1986, to divest itself of commercial space launch activities, American competition against Arianespace waned in terms of launch services due to a lack of available boosters. However, since the mid-1990s, the American position has rebounded with several efforts, including the two USAF-sponsored enhanced expendable launch vehicle (EELV) programs, and the commercial ventures between American and Russian firms for projects like Sea Launch (Boeing and Energia) and International Launch Services or ILS (Lockheed Martin, Energia, and Khrunichev State Space Center) using the Proton and Delta series rockets.⁵⁸ In addition, to fill the existing gap in small-to-medium launch vehicles, the Italian-led Vega project has been seeking to obtain ESA funding to gain a niche in the ever-growing low-Earth orbit (LEO) constellation market associated with such mass arrays of small communication satellites like Iridium, Globalstar, Teledesic,

⁵⁷ Mr. Luton was the head of CNES and ESA before coming to Arianespace. CNES, with a 32 percent holding, is the largest shareholder in Arianespace. In total, the French space agency, French firms and French banks hold a 54 percent majority stake in Arianespace. “Controversy Erupts over Top Arianespace Post,” *AW&ST*, 07 April 1997, 45.

⁵⁸ Chris Bulloch, “Launch market getting out of step,” *Interavia*, March 1998, 45-48.

and SkyBridge.⁵⁹ All these newly developed launch systems, especially the American EELV programs, directly threaten Arianespace and its position as the leader in the global marketplace, despite the continued success of its ongoing and fully-booked Ariane 4 program.

To counter these new “threats” from overseas against the Ariane, its instrument of “European” space sovereignty, the CNES has tried to cut operating costs at Kourou for pre-launch and post-launch work by pushing for more efficiencies from its Arianespace contractors⁶⁰ and by reducing the financial burden of some older programs like SPOT that are struggling to attract customers and make a profit.⁶¹ Second, the French have pushed the ESA to fund the \$1.3 billion Ariane 5E upgrade, a proposal to add a modified cryogenic upper stage to the current Ariane 5 to increase its lifting capacity.⁶² Third, the French space establishment has begun trying to diversify its position. These efforts include incorporating bilateral programs with NASA for the Mars Express Orbiter and the Mars Sample Return missions and environmental projects like Earth Observer/Earth

⁵⁹ CNES director-general Gerard Brachet has repeatedly referred to Vega as “an Italian-led program” in which CNES investment has yet to be considered. Peter de Selding, “CNES Ponders Role in Motorola’s Celestri,” *Space News*, 6-12 April 1998, 32.

⁶⁰ With more streamlined launch procedures, Arianespace hopes to reduce costs to 20 to 30 percent less than those now paid for Ariane 4 launches. Pierre Sparaco and Michael Taverna, “Arianespace Exploits Delay in Ariane 5,” *AW&ST*, 16 June 1997, 201.

⁶¹ CNES officials have made it clear that they want to slash as much as 75 percent from the current SPOT program to develop newer, smaller satellites. SPOT 5 will be the end of the current line of vehicles. Efforts to help SPOT Image, which markets the imagery, are underway. Peter de Selding, “CNES Wants to Slash Cost of Spot Program,” *Space News*, 09-15 March 1998, 4.

⁶² Selding, “CNES Ponders Role in Motorola’s Celestri,” 32.

Watch using remote sensing, as well as offering to lease its launch facilities at Kourou for use by Ukrainian or Italian boosters.⁶³

Overall, Arianespace and the Ariane rocket program, despite some limited and brief criticisms to the contrary, have become, in the words of one French official, “a technological and commercial success, achieved thanks to an exemplary industrial cooperation in Europe.”⁶⁴ The \$7.9 billion dollar (7.2 billion ecus) Ariane 5 program has retained the potential for future profitability, but dogged by its history of high costs and untested reliability, it has not yet fully proven itself to the rest of the world.⁶⁵

⁶³ CNES has also been attempting to foster a closer relationship with the Russians for launching a Soyuz variant from Kourou. Michael Taverna, “CNES Pushes Joint Mars Missions with NASA,” *AW&ST*, 06 April 1998, 30.

⁶⁴ Part of a communiqué from the French National Education, Research and Technology Ministry. Claude Allegre, interview in Paris on France-Info Radio, 09 July 1997, (FBIS-WEU-97-190, 09 July 1997).

⁶⁵ “A bit thin,” *The Economist*, 28 March 1998, 75.

VI. THE HELIOS MILITARY SATELLITE PROGRAM

Since at least 1978, the French have dreamed of having an observation satellite program that would allow them to compete on the technological “high ground” with the U.S. in terms of commercial remote sensing opportunities, to offset the LANDSAT series, and to reduce their dependence on American imagery intelligence for military purposes. Initially, the requirement to gain a greater degree of autonomy in intelligence emerged from French and German concerns with the U.S. about its failure to share with NATO a large portion of the technical intelligence that the Americans obtained about Soviet forces in Europe.⁶⁶ Later as the Soviets began to remove their tactical nuclear and conventional forces from Eastern Europe, the level of criticism intensified. For the French, the need for greater intelligence access to support their independent verification analysis was a strategic requirement.⁶⁷ After the Gulf War and Bosnia, more interest in military satellites was shown in French defense and political circles, especially with satellite-based intelligence being potentially used to support France’s new long-range

⁶⁶ Initially, criticism was voiced by France and West Germany. (“Franco-German collaboration on military satellites,” *Jane’s International Defense Review*, September 1984, 1197.) However, German officials later suggested that their official position was still under review. (“German view on military satellites,” *Jane’s International Defense Review*, November 1984, 1603).

⁶⁷ A member of France’s Foreign Ministry reinforced the concern for independent intelligence when he stated, “We consider that verification is a European business. We have the men and populations to protect here.” Michael Mecham, “Gulf War Rekindles European Interest in Developing Military Satellites,” *AW&ST*, 08 April 1991, 59.

conventional precision strike weapons.⁶⁸ In light of these shortfalls in knowledge, the French resolved to develop the independent technical means to obtain intelligence from space in order to support their own national needs.

The SPOT program had its origins in a French-sponsored project for the ESA that was rejected because it was insufficiently advanced to warrant further developmental effort or cost. In response, the French undertook the satellite project that later would include Sweden and Belgium as partners along with the CNES to develop SPOT. First launched in 1986 after nearly a decade of development, SPOT 1 is an electro-optical imaging (EOI) satellite that uses a direct downlink via secure communications to transmit images to a series of global ground sites to provide both panoramic and stereo imagery to its customers.⁶⁹ Later, the series was expanded to include SPOT 2, SPOT 3 (which failed in November 1996), and the most recent addition, SPOT 4, which was orbited on 24 March 1998. Long a global leader in the field of commercial space imagery, SPOT faces

⁶⁸ To obtain its own autonomous strike capability, France has embarked on developing several versions of the Apache cruise missile, including one variant that will use a millimeter wave radar, an IR seeker, and inertial navigation to attack strategic targets deep inside an enemy's territory. The missile will be designated APTGD or *Armement de Précision Tiré à Grande Distance*. Its capabilities will be supported by mapping and targeting data derived from SPOT and Helios. Craig Covault, "New French Missiles Expand Attack Options," *AW&ST*, 09 January 1995, 44.

⁶⁹ SPOT stands for Satellite Pour l'Observation de la Terre and is designed and built by Matra-Marconi, a joint British-French firm. The French military was heavily involved with the design and funding of SPOT, probably in order to gain information for targeting the French nuclear arsenal. Although Sweden and Belgium are partners in SPOT, the CNES controls, tasks, and regulates the use of the vehicle. Chris Bulloch, "Europe's Space Effort: A Vital Luxury?," *Interavia*, September 1978, 847-851.

the prospect of losing some of its reported 60 percent market share to new commercial imagery competitors in the United States, Russia, and potentially India and Japan.⁷⁰

During the Gulf War, the French military discovered to its surprise that the SPOT architecture possessed several unforeseen limitations, the lack of ground resolution in particular, that forced French commanders to almost completely rely on American space-based intelligence, including IMINT and SIGINT. Following the war, a cry went out within France, as stated by Minister of Defense Pierre Joxe, “to develop an autonomous capacity for space observation” because a failure to do so would affect France’s “very status” as an independent power.⁷¹ To solve this problem, the French research and military establishment moved to accelerate the development and deployment of its fledgling military observation satellite program, known as Helios, in order to return the concept of strategic autonomy back to France.⁷² Based on the framework of SPOT 4, the Helios 1 project resulted in the production of two vehicles (one to launch and one as a

⁷⁰ Since SPOT 4 has the same infrared (IR) line scanner as the military Helios 2 satellite, SPOT Image, the marketer of the imagery, hopes to improve its commercial sales with medium resolution IR and multispectral imagery for environmental use worldwide. “SPOT 4 Satellite Generation Reviewed,” *Air & Cosmos/Aviation International*, 27 March 1998, 34 (FBIS-WEU-98-121, 01 May 1998).

⁷¹ Pierre Joxe, “Défense et renseignement,” *Défense Nationale* (July 1991): 17-18, 21.

⁷² The concept for Helios was first introduced in 1985, while the funding for its initial research and development was included within the 1987-1991 programming law submitted by the Chirac government in 1986. (“French Five-Year Budget Proposal Includes Funding for New Missiles, Ships, and Reconnaissance Satellites,” *AW&ST*, 17 November 1986, 25.) Its original cost estimate in 1991 was Ffr 7 billion (\$1.4 billion), but the cost has grown to Ffr 11.6 billion (\$1.98 billion) through early 1998. Mark Hewish, “France to shoulder burden on Helios II,” *Jane’s International Defense Review*, July 1998, 12.

spare) and was declared operational in July 1995. Funding for Helios was achieved by using a cost-sharing approach based on the following formula: France (79 percent), Italy (14 percent), and Spain (7 percent).⁷³ Ironically, the success of Helios 1 in achieving a measure of autonomy in intelligence for France came as a result of American industrial and scientific assistance to the French to solve problems in manufacturing the vehicles.⁷⁴

In the wake of the introduction of Helios 1, France has been attempting to persuade its Italian and Spanish allies, along with the Germans, to fund the next generation EOI satellite, Helios 2, for development and launch around 2002. However, following the French government's decision to abandon the Ffr 14 billion (\$2.4 billion) Horus radar satellite program in April 1998, the future of its cooperative satellite development efforts with Germany on Helios 2 seems uncertain.⁷⁵ Initially, the Germans were hesitant to support the French initiative concerning Helios 2, despite its being touted as a "European" program, due partially to their desire to build the Horus radar satellite. The German position was based, with regards to technology, on the fact that Helios 2 will incorporate an infrared (IR) camera to complement its traditional EOI system, while the

⁷³ Craig Covault, "Helios 1A Bolsters European Recon," *AW&ST*, 17 July 1995, 27.

⁷⁴ The Americans traded atmospheric modeling data with the French under the auspices of a military space technology agreement negotiated between the two countries in 1992. This modeling data was important in developing some of the software used in the programming of the Helios vehicles. Aérospatiale also requested to exchange information on satellite integration concerning optical system handling and contamination control. Craig Covault, "France Seeks U.S. Cooperation Despite Espionage Charges," *AW&ST*, 03 May 1993, 24.

⁷⁵ Christina Mackenzie, "France Abandons Missiles, Horus Effort," *Defense News*, 13-19 April 1998, 3.

Horus program (once called Osiris by the French) would have utilized a synthetic aperture radar (SAR) to penetrate clouds and adverse weather, something the French Helios 1A/2 EOI systems can not do. Politically, the Germans have also been reluctant to contribute significant funding to Helios 2 due to a desire not to offend the U.S. by seeking to acquire competing intelligence support from the French. Additionally, the Italians and the Spanish have also been slow in jumping on the Helios 2 bandwagon, perhaps partially due to their possible dissatisfaction with the controlling influence exerted by the French, as well as to their own domestic needs to support other programs.⁷⁶

The significance of the Helios and Horus programs within a European context is striking. France's insistence on pushing ahead with Helios, alone if necessary, has put it into conflict with some policy-makers in Germany who feel that Horus, using SAR technology, would be more useful. Several issues seem to be clearly defined by national priorities. Helios is a French-made system, controlled chiefly by France's military and used for providing answers to national intelligence problems. The European EOI industry is generally centralized within French-dominated programs and supports the growth of French industries. France has portrayed Helios as lessening its dependence on the Americans for national intelligence support. The Germans favored Horus due to their need for a vehicle using radar technology to penetrate the cloudy areas of Europe where

⁷⁶ Ultimately, the Spanish have declared that they will participate in Helios 2, but at a reduced level of funding, around three percent. Mark Hewish, "France to shoulder burden on Helios II," 12.

they have intelligence gaps, including Bosnia and Eastern Europe.⁷⁷ Not without significance in this debate on Helios versus Horus is the fact that the majority of the developmental work for any radar-based initiative would have been accomplished by German-dominated aerospace firms. The French and the Germans, along with the rest of the Western European Union states, do agree on the need to possess “a strategic intelligence-gathering capability that will enable them to assess crisis situations independently.”⁷⁸ However, in the wake of the Horus debacle, French and German space-related relations have become strained, with each side portraying the other as responsible for having allowed the program to fail. Despite German insistence that financial limitations were to blame for their inability to fund their share of either Helios 2 or Horus at present, the French feel betrayed and thus justified in canceling their role in Horus by citing “the prior defection of our German partner.”⁷⁹

Moreover, the Germans seem to want to focus their space endeavors on other non-intelligence systems like the Trimilsatcom initiative involving the United Kingdom,

⁷⁷ The German Defense Minister Volke Rühe summed up the feelings of a sizeable portion of Germans about the true aims of the French-made Helios when he stated, “I do not need to know who is hiding behind the sand dunes of Chad.” Despite his earlier pledge to Chirac in 1996, Prime Minister Kohl has not pushed to find the money to support the funding of Helios 2. Alexander Szandar, “Franco-German Relations Under Strain,” *Interavia*, October 1997, 4.

⁷⁸ This statement came from the Franco-German meeting between Kohl and Chirac in Nuremburg in December 1996. Jac Lewis, “France is determined to play a central role in Europe’s Defense,” *JDW*, 12 February 1998, 20.

⁷⁹ Comments by French Defense Minister Alain Richard. Bernard Bombeau, “Program Review Preserves Basic Programs,” *Air & Cosmos/Aviation International*, 17 April 98, 20 (FBIS-WEU-98-124, 04 May 1998).

France, and Germany in order to develop a European secure communications satellite capability.⁸⁰ This desire for better satellite communications may have its roots in the situation in Bosnia, where German units were unable to effectively coordinate their military operations due to a lack of available satellite channels.⁸¹ Yet, in spite of the lack of European support for Helios 2, the French have indicated that they will develop and build the satellite system by themselves, because it is in their national interest to do so. For them the calendar, not European agreement, dictates the decision to go it alone. According to one French official, "If Helios 2 is to be ready for lift-off in 2002, we cannot wait around for Germany."⁸² Although this plan has been advanced, Helios 2 has been held up in recent months by the DGA in efforts to pressure Matra-Marconi Space to cut the projected cost of the system. The DGA is withholding approval on the final production contract until the price is settled. If a compromise cannot be reached, there are indications that the DGA might be forced to accept building just one Helios satellite and to do without a spare vehicle to save money and get Helios 2 operational by 2002.⁸³

⁸⁰ Trimilsatcom will replace the UK's Skynet 4 and the French Syracuse II communication satellites around 2005. Damian Kemp, "Another step forward for European satcom system," *JDW*, 07 January 1998, 8.

⁸¹. In the Bosnian war, 45 allied satellites were in service, but all but two of them were reserved for American use. Karl Jetter, "Following the American Example," *Frankfurter Allgemeine Zeitung*, 31 January 1997, 16 (FBIS-WEU-97-022, 31 January 1997).

⁸² "France plans to start work on Helios-2 alone," *JDW*, 05 November 1997, 5.

⁸³ The revised plan has included the idea that vital components (those involving lengthy fabrication time) for the second Helios 2 satellite be ordered in case they are needed in the future should an emergency arise with the first vehicle. Peter de Selding, "France May Trim Helios Contract," *Defense News*, 9-15 March 1998, 4, 36.

VII. EUROPEAN CONSOLIDATION AND ATLANTIC ALLIANCES

A. CONSOLIDATION WITHIN FRANCE

One of the current controversies within French defense analytical circles has centered on whether privatization and integration of French firms within European structures should be favored over a “France first” policy of internal restructuring on an aerospace sector-by-sector approach before embarking on greater plans to deal with Europe’s defense procurement dilemmas. In this light, two examples illustrate the basic issue of which approach offers the greatest merit for France, given its strategic need to maintain control over its procurement process. The two examples are the Dassault-Aérospatiale debate within the aerospace “pole” and the reorganization of the Thomson electronics “pole.”⁸⁴

1. The Merger of Dassault - Aérospatiale

The primary focus of the debate surrounding semi-private Dassault Aviation and the state-owned Aérospatiale has concerned whether Dassault should give up its relatively independent status and agree to fall under the control of the French government or whether Aérospatiale should be privatized and merged with Dassault. This on-again,

⁸⁴ According to Defense Minister Charles Millon, a Gaullist, in a speech at the Center of High-Level Studies of Arms (CHEAr), France will attempt to structure its arms sector around “four industrial poles” including aeronautics and space (Dassault-Aérospatiale), electronics (the “new” Thomson), nuclear (CEA’s Military Applications Directorate - DAM), and electromechanical (DCN and Giat Industries). Jean-Pierre Casamayou, “New Bases for Arms Industry,” *Air & Cosmos/Aviation International*, 20 September 1996, 11-12 (FBIS-EST-96-017, 20 September 1996).

off-again debate has loomed over Dassault for years, especially following the repeated threats by the government to nationalize it since the mid-1970s. The crux of the debate can be summed up in one word: control. On one side, Dassault wants to have the ability to decide its own economic fate and have the freedom to act to accomplish its goals. Conversely, the French government, in conjunction with a compliant state-owned Aérospatiale, desires to have Dassault return to the fold in a national sense. For the government, an independent Dassault, however limited its authority, represents a “loss” of control, and thus the potential ingredient for the development of industrial inefficiency and a lack of strategic focus.⁸⁵

Often the concepts of merger and privatization have been mixed together in discussions about the situation between Dassault and Aérospatiale. Serge Dassault, the current chairman, has reiterated that a merged Dassault-Aérospatiale company must be privatized in order for any deal to be stuck with the government. Naturally, the French government wishes to maintain some control over at least a share of the company. At present, that degree of shareholder control seems likely to be one that will provide it with a clear majority, especially if Aérospatiale is transferred control of the French government’s majority interest in Dassault (46 percent).⁸⁶ Dassault desires to have the

⁸⁵ Several attempts to nationalize Dassault Aviation have been rumored to have been contemplated, especially in 1977, 1981, 1986 and since 1995. Legacies surrounding the personal character of Marcel Dassault and his attempts at lobbying may still influence current events with regard to the company itself. Kolodziej, *Making and Marketing Arms*, 222-223.

⁸⁶ Various rumors concerning the “imminent nature” of this share transfer from the French government to Aérospatiale have circulated in the press since the beginning of

freedom of action to assimilate Aérospatiale by whatever means it feels will position the company to be profitable. If slashing a number of jobs, disestablishing inefficient sections of Aérospatiale, or merging them with foreign companies is necessary, then Dassault wants the power to accomplish it. Without this ability, a merger seems unlikely at best.⁸⁷

Interestingly, Aérospatiale has recently undertaken to reorganize itself into nine separate affiliates to facilitate tie-ups with other French and European companies.⁸⁸ Part of this restructuring by Aérospatiale has happened as a result of its decision to graft some of its affiliates into the “new” Thomson electronics company. However, one must wonder what might become of Dassault if the aerospace-related portions of Aérospatiale are joined with a third party, either another European aerospace firm such as British Aerospace or GEC or a larger international consortium like Airbus Industries. It is unlikely that France would sacrifice its national champion in the manufacturing of fighter aircraft to a third party, international or otherwise, without at least having attempted to create a “French core” similar to what has been achieved for the electronic “pole” and the “new” Thomson.

1998. Most recently Defense Minister Alain Richard suggested that Aérospatiale was likely to receive control of the government’s shares in the near future. Bernard Bombeau, “Program Review Preserves Basic Programs,” 20.

⁸⁷ Dassault reluctantly agreed to a merger in 1996 based on Aérospatiale being privatized but the new Socialist government’s refusal to permit privatization killed the deal. Dassault has recently publicly stated that there is no advantage to a merger and that he “preferred to be small and to earn money.” Ed Blanche, “No Advantage in a merger, says Dassault,” *JDW*, 03 December 1997, 5.

⁸⁸ “France leads the way on consolidation,” *JDW*, 25 February 1998, 3.

2. The Reorganization of Thomson - CSF

Like the debate involving Dassault and Aérospatiale, the decision-making process that governed the restructuring of Thomson-CSF had its roots in the arguments over “control” as well. However, in this situation, the stakes seemed to center on questions of national sovereignty as well as economic integration, a “Franco-French” plan against a “deliberately European” offer, in what one French manufacturer called “the biggest industrial reorganization ever attempted in France.”⁸⁹

By announcing the decision in October 1997, the French government under Prime Minister Jospin shared the vision of President Chirac that France should regroup its own industry before embarking on restructuring the entire European defense sector.⁹⁰ In the deal, the government chose Alcatel and Dassault Industries as its partners for the giant state-owned Thomson, a maker of defense electronics. In doing so, the French government also turned down an offer from rival Lagardère, the parent company of Matra, to act as the prime private sector shareholder for Thomson. Lagardère had submitted a bid that would have linked the German defense company Daimler Aerospace SA (DASA), a subsidiary of Daimler-Benz, and British Aerospace (BAe) in a move that would have acted “as the catalyst to bring together the industries’ main players in

⁸⁹ Comments by Serge Tchuruk, chairman of Alcatel-Alsthom. Jac Lewis, “Thomson triad is poised to take a top-three slot,” *JDW*, 22 October 1997, 18.

⁹⁰ Noteworthy is the fact that the new Thomson will have 14,000 employees in Europe outside France. Duncan Macrae, “France first, Europe can wait...,” *Interavia*, November 1997, 20.

Europe.”⁹¹ However, by opting for the Alcatel-Dassault plan, the French government re-emphasized its intention to create a “French core” for its electronic industry “pole,” centered around the “new” Thomson.⁹²

The specifics of the deal have both Alcatel and Dassault contributing assets to Thomson in exchange for receiving a 16.36 percent share and a 6 percent share, respectively, in the company. State-owned Aérospatiale will gain a 4 percent holding, while public ownership will exist through either purchases of common stock (approximately 30 percent) or Thomson employee holdings (3 to 5 percent). The French government will retain approximately a 42.94 percent share (down from 58 percent), but will keep a blocking minority position on the company board of directors and the right to appoint a new chairman. A new satellite company made up of the surrendered assets of Aérospatiale, Alcatel, and Thomson-CSF will be formed and known as the Société Commune de Satellites. It will be 51 percent owned by Alcatel and 49 percent by Thomson. Aérospatiale will also be offered Ffr 1.25 billion (\$208 million) in cash for

⁹¹ Lagardère has agreed to link Matra BAe Dynamics, its joint venture with BAe, with Lenkflugkörper (LFK), DASA’s missile unit, by acquiring a 30 percent share of LFK. Moreover, it would have merged Matra-Marconi Space (MMS) with DASA’s space affiliate to form a truly joint British-French-German aerospace company. Jac Lewis, “Rivals for Thomson rally up support as bids close,” *JDW*, 14 May 1997, 23.

⁹² If approved by the French privatization board, the new Thomson would become the world’s biggest military communications supplier, the third largest global supplier in radar and electronic countermeasures, and the fourth worldwide builder of telecommunications satellites. Jac Lewis, “Thomson triad is poised to take a top-three slot,” *JDW*, 22 October 1997, 18.

transferring its minority holdings in other French defense companies to the new space firm.⁹³

The significance of the French government's decision with regard to Thomson is that the grouping will have the potential for creating a French defense juggernaut, whose size and strength will discourage any European partners from wishing to ally themselves with it. Some critics of the plan, such as Manfred Bischoff, chairman of DASA, have said that the accord was "purely French in nature and lacking a European perspective."⁹⁴ Supporters of the plan, including Serge Tchuruk, have replied that a semi-private Thomson was a better choice for France because "negotiating separately with Europeans before proceeding with restructuring in France would have left the government in a weak . . . position." Furthermore, Defense Minister Alain Richard has stated that "the new group can seal alliances with other French and European partners." However, given its new economic "weight," these alliances within Europe would seem to be destined to be under preponderant French influence, if not control.⁹⁵

⁹³ The deal is less than what the Dassault family had wanted (a 7 to 8 percent share) by sacrificing Dassault Electronique, while Aérospatiale also had been counting on a larger share (10 percent) for its satellite unit. Jac Lewis, "French blueprint reveals new-look industry links," *JDW*, 22 April 1998, 22.

⁹⁴ Jac Lewis, "Thomson triad is poised to take a top-three slot," 18.

⁹⁵ *Ibid.*, 18.

Lastly, the view of some in Germany, especially its aerospace defense manufacturers, seems to summarize the feelings of Europeans who do not live in France:

Any European country seeking to position itself at the centre of Europe, considering its European partners as satellites in orbit around it, runs the risk of isolating itself in the long term. Any quest for leadership and domination will produce counter-reactions, leading to the end of a truly competitive European aerospace industry.⁹⁶

B. CONSOLIDATION WITHIN EUROPE

Within both Europe and the United States, the topic of consolidation in the defense industries has been a hot topic in recent years. Many industry experts have pointed at the U.S. industry's relatively rapid, and sometimes "bloody," actions to reform itself within the defense sector as the model that Europe should attempt to emulate for its own restructuring.⁹⁷ For many others, what the concept of "consolidation" really means is open for debate.⁹⁸ However, most industry and government officials within Europe, including the French, agree that a reorganization within the defense industrial sectors, with the potential for some degree of consolidation, must take place in the near term for

⁹⁶ Comments by Manfred Bischoff, chairman of DASA. Duncan Macrae, "France first, Europe can wait...," *Interavia*, November 1997, 20.

⁹⁷ The defense establishment in the United States was basically reduced from multiple companies, all having a hand in some aspect of procurement, to just two giants, Lockheed Martin and Boeing, with several "niche" partners such as TRW, Loral, and Raytheon-Hughes.

⁹⁸ To some, consolidation means the absorption of smaller firms into a larger entity. For others, it means the creation of joint ventures to address specific markets or products. To some others, it is a cross-flow of investments and share-swapping. Finally, for still others, it is cooperation marked by financial offsets and ad hoc teaming to win specific programs abroad. Gregory Copley, "How Much Defense Industry Consolidation is Enough?," 6.

European industry to ensure its continued survival. The tough question is deciding how to accomplish it.

For some proponents, the idea of trans-national ownership within Europe is the key, while this concept is vehemently opposed by advocates of keeping defense production a national security domain; the latter prefer the “we make it for ourselves” approach. In a world of decreasing national budgets, collaboration and cross-ownership may be the only methods by which a national security base can be maintained in vital technology areas. Additionally, this method might provide the non-defense, high-technology sectors of national economies the ability to flourish as a result of the creation of centers of excellence by defense and aerospace ventures. Nationalists worry that the current rounds of acquisitions and mergers may lead to firms that have no national identity. However, the logic of maintaining national ownership would seem only to reinforce the current trend toward a “Fortress Europe” based on a fragmented industry struggling to consolidate, and a “Fortress America” based on an industry that is well into its own restructuring.

If questions of how to solve the national concerns of Europe’s defense establishments are complex, the international arena may provide some answers to the problems of strategic independence. Several defense leaders on both sides of the Atlantic have seen the need to re-establish trans-Atlantic relationships in the defense industrial sector to match the political and military efforts that have developed over the last 50 years. To prevent an “ours” and “yours” industrial mentality from arising between Europe and America, the idea of forming industrial strategic alliances has been getting a new

“shot-in-the-arm” in recent months. Vance Coffman, chairman and CEO of Lockheed Martin, has argued that alliances and joint ventures offer a way for firms to pool their research and development and production costs. This is urgently needed, in his view, “to realign the defense industrial base that underpins the Atlantic alliance, ...[because] encouraging cutthroat competition between European and U.S. aerospace companies would be bad business as well as bad policy.”⁹⁹ Other proponents of joint endeavors have suggested forming two or three international consortiums consisting of firms chosen by their governments to compete against each other for major procurement contracts. Supporters have suggested that this concept might be the precursor for completing consolidation within both Europe and the United States.¹⁰⁰

However, the second kind of international venture that has dominated Europe since late 1997 has been centered on utilizing an established multinational consortium, Airbus Industries, to unite the fragmented national aerospace industries into one unified company. The proposed Single Corporate Entity (SCE) has been offered as the means to integrate all the aircraft design and production capabilities of its four members (France,

⁹⁹ Excerpts from a speech given by Coffman at the 1998 Wehrkunde conference in Munich on 07 February 1998. His comments, according to observers, were warmly received by British and German officials, but not by the French. Additionally, Coffman was emphatic about the need for continuing consolidation and rationalization of Europe’s industries. He argued that forming alliances could proceed in parallel with this process. Anthony Velocci Jr., “Mega-Consortium Concept Emerging,” *AW&ST*, 16 February 1998, 25-26.

¹⁰⁰ The mega-consortium idea has been supported by Paul Hoeper, Deputy Under Secretary of Defense for International and Commercial programs. Its importance has diminished with the rise of the Airbus SCE concept. *Ibid*, 25-26.

Germany, Great Britain, and Spain) under a single corporate management. By grouping the various units together, Airbus Industries would present a stronger global competitor to Boeing by increasing efficiencies and reducing duplication.¹⁰¹ In light of these potential gains, all the member governments have agreed that a Single Corporate Entity is fundamentally necessary.¹⁰² However, more importantly, a discussion concerning an SCE has led to an even more grandiose concept: the merger of all the national defense components into a “super” European defense company.

This firm, the European Aerospace and Defense Company (EADC) or Euroco, might be the ultimate vehicle for an international group that could produce products for civil and military applications by manufacturing them on combined production lines. In December 1997, the heads of government of France, Great Britain, and Germany expressed support for this idea, and the politicians asked their respective defense establishments to produce a plan to restructure and merge British Aerospace, Aérospatiale, and DASA. During these discussions, it was suggested that the “new” Airbus company being considered might be the best means of achieving this goal.¹⁰³ In

¹⁰¹ In the Airbus consortium, Aérospatiale and DASA are the largest shareholders with 37.9 percent each, followed by British Aerospace (20 percent) and CASA of Spain (4.2 percent). The United Kingdom and Germany have been the driving forces behind the Airbus SCE concept. Pierre Sparaco, “Narrow Cultural Concepts Threaten France’s Aerospace Legacy,” *AW&ST*, 22-29 December 1997, 98B.

¹⁰² Airbus Industries is now a Groupement d’Intérêt Economique (GIE), a French legal construct, which makes no profits or losses in its own right. These funds go to the four shareholder industries that own the manufacturing facilities based on their percentage. Michael Skapinker, “From national champions to a giant-killer,” *The Financial Times*, 20 February 1998, 30.

¹⁰³ Heinz Schulte, “Euroco unbound,” *JDW*, 08 April 1998, 24.

the following months, a sort of “method” war has broken out between the proponents for the all-encompassing merger of Europe’s defense industries (including other nations like Sweden and Italy), supported by British Aerospace and DASA, and the advocates of a national sector-by-sector approach along speciality lines (fighters, missiles, helicopters, space systems), generally the French government and a portion of its industry.

Three key sets of differences have so far prevented an agreement on the formation of an EADC: the level and type of ownership, the assets to be consolidated, and the urgency of the whole process. First and foremost among the problems has been France’s insistence on maintaining its majority share of state ownership in Aérospatiale. British Aerospace has absolutely refused to consider being associated with a future European company that is not a wholly independent and fully private firm.¹⁰⁴ DASA has agreed, declaring that the idea of an EADC “is about France coming to terms with the fact that the special Franco-German relationship can no longer be the basis for running Europe’s industrial affairs.”¹⁰⁵ However, the French government feels that it is important to keep a “golden share” within any scheme of EADC ownership. Defense Minister Alain Richard has stated “that the type of stock ownership, whether public or private, cannot be made a prerequisite [for membership].”¹⁰⁶ For France, a significant element of public ownership

¹⁰⁴ British Aerospace does not even support giving the UK government a veto ability. Paul Beaver, “BAe hardens its stance on Euroco,” *JDW*, 15 April 1998, 27.

¹⁰⁵ A Daimler-Benz official said that it would not let politically motivated arguments calling for more understanding of the French position obstruct the establishment of a privately controlled industry. Heinz Schulte, “Euroco unbound,” 24.

¹⁰⁶ Jean-Pierre Neu, “Alain Richard: Privatization of Aérospatiale Could Not Be Prerequisite for Airbus,” *Les Echos*, 24 March 1998, 10 (FBIS-WEU-98-083, 24 March

is required in the new entity to serve as a rampart against the firm being driven solely by market forces or the need to please shareholders.¹⁰⁷

Second, France has countered that an EADC should be developed along sector lines by pushing mergers among the speciality components of Europe's national defense firms. Combat aircraft tie-ups could be made between Dassault and British Aerospace, and the missile business could be organized around Aérospatiale, Matra BAe Dynamics, and Alenia of Italy, as well as space systems under Matra Marconi Space, GEC, and DASA. The French government has favored the sector approach due to its dominance in several marketplaces: space equipment, space launchers (Ariane), helicopters, and missiles. By combining on a sector-by-sector basis and then proceeding toward a "super" European merger, France would enable its companies to position themselves well financially in terms of annual sales and overall capital value to compete with British Aerospace and DASA.¹⁰⁸ BAe has attempted to counter the French actions by investing in other national aerospace firms (for instance, its recent 35 percent stake in Saab of Sweden)¹⁰⁹ and continuing trans-Atlantic ventures with American firms in projects like

1998).

¹⁰⁷ Jac Lewis, "France insists on state ownership," *JDW*, 08 April 1998, 24.

¹⁰⁸ Supporters of the sector-by-sector approach are Lagardère and most small-to-medium French aerospace firms. Opponents include Dassault, Alcatel, and interestingly Aérospatiale, which fears being dismantled. *Ibid.*, 24-25.

¹⁰⁹ The company paid \$452 million for its new stake in Saab. John Morrocco, "British Aerospace, Saab Set for Deeper Collaboration," *AW&ST*, 04 May 1998, 28.

the Joint Strike Fighter (JSF) initiative. These efforts have increased BAe's overall financial strength and political clout abroad.

Finally, the growing rate of defense-related mergers in the United States has pushed the issue of time into the discussion over EADC development. British firms like GEC and BAe have felt that opportunities for growth and mergers are falling by the side of the road, especially in the United States, while the Europeans wait for the French to make up their minds about how they will restructure their firms. Therefore, several British advocates (in BAe and the government) have called for going ahead with merger discussions anyway, without the French if necessary. Some British officials such as Defense Minister George Robertson have threatened to form a private grouping with other Europeans and, if that does not prove successful, to go after an American merger solution.¹¹⁰ In the French camp, the urgency of a decision concerning an EADC has not been an important factor; it has been seen by some French officials as merely a ploy used in negotiations. Alain Richard has downplayed the issue of time by stating, "Consolidating European defense industry is going to be hard work . . . So it is normal to use each other's statements as tools in these negotiations."¹¹¹ Interestingly, German aerospace observers have placed Germany in the middle of this largely political debate, but have stated that the degree of influence of Chancellor Helmut Kohl's government

¹¹⁰ Brooks Tigner, "As France Stalls, Brits Warn of U.S. Buys," *Defense News*, 27 April - 03 May 1998, 1.

¹¹¹ Theresa Hitchens, "Europe's Mergers Nudge French," *Defense News*, 4-10 May 1998, 1.

over Daimler-Benz and DASA is limited and may not be sufficient to effectively halt any future moves by these industrialists.¹¹²

Whatever the method selected, it seems that a choice for addressing consolidation and rationalization will have to be made soon. Moreover, several members of the British House of Commons have expressed concern that any proposed merger by British companies as part of a broader European effort might endanger their continued access to American technology and Pentagon weapons programs. Most experts in Britain believe that the U.S. would be reluctant to share advanced technology with a consortium that included French firms. As stated by Lord Gilbert, the British defense procurement minister, “we’re anxious to see that access to sensitive technologies is in no way imperilled.”¹¹³

C. EUROPEAN COOPERATIVE ARMAMENT ORGANIZATIONS

Now that the topic of what might be done has been discussed, the question of who should plan and coordinate joint procurement efforts for Europe and the Atlantic Alliance will be examined. Within Europe, the three groups that are most closely connected with attempting to develop the coordination of procurement efforts have been the Organisation de Cooperation Conjointe en matière d’Armement (OCCAR) and the Western European

¹¹² DASA generally has favored the British position as stated by BAe . Heinz Schulte, “Euroco unbound,” 24.

¹¹³ Comments made at a joint session of the House of Commons defence and industry committees on 30 April 1998. Alexander Nicoll, “European defence changes ‘must not bar US,’” *The Financial Times*, 01 May 1998, 9.

Armaments Organization (WEAO) with the WEU, and the Conference of National Armament Directors (CNAD) within NATO.

Within the WEU, OCCAR and WEAO have been trying to develop and coordinate the joint procurement of weapon systems for a number of years. OCCAR was founded by the UK, Germany, France, and Italy to manage several joint programs for the Euromissile and Eurocopter consortiums.¹¹⁴ WEAO is essentially a group designed to promote common military requirements, establish standards, and assist in research. However, each group's legal status is currently an issue. WEAO is a WEU entity, but OCCAR is not one and requires a legal charter to be able to award contracts, manage budgets, or supervise programs on behalf of the WEU. A recent attempt to resolve this legal impasse by the larger WEU nations was blocked in November 1997 by their smaller WEU allies on the grounds that it did not represent a fair deal in terms of procurement for all the members involved. The smaller nations cite the EU policy of *juste retour*, which holds that member states should receive a strict one-for-one return on economic benefits for defense contracts awarded to local companies from another EU state. Further negotiations have remained at a standstill.¹¹⁵

¹¹⁴ OCCAR is also known as the Joint Armaments Cooperation Agency (JACO). Euromissile makes the Roland, HOT, and Milan missile systems and Eurocopter makes the Tiger helicopter. Damian Kemp, "OCCAR to spread wings with more programmes," *JDW*, 05 February 1997, 11.

¹¹⁵ Giovanni de Briganti, "WEU Leaves Arms Agency in Question," *Defense News*, 1-7 December 1997, 14.

An additional problem with respect to the EU member nations concerns the willingness of the members in a future European Armaments Agency to apply EU open market laws to the defense trade. At present, each nation may, and usually does, exempt all its defense trade from cross-border competition rules under Article 223 of the EU's founding Treaty of Rome. Most nations have sought to retain Article 223 and would most likely be hostile to changing its status. The key would be to negotiate a settlement that would allow members of the EU not to invoke Article 223 within an internal framework, but remain able to apply it in their dealings outside the realm of a future Agency's business.¹¹⁶

Within NATO, the CNAD has been overseeing and coordinating common arms development for nearly 30 years. However, the CNAD has essentially been an arms cooperation group devoted to the exchange of information between NATO members, but without the ability to enforce actions within the domestic political systems of its members. The CNAD's main success has been to foster the development of defense programs that two or more nations later decide to pursue toward actual production. France has been a major participant within the CNAD and has even purchased some high technology platforms with NATO as a result, most notably AWACS aircraft.¹¹⁷ Presently, the CNAD is undergoing a review of its continuing role within NATO's procurement

¹¹⁶ Theresa Hitchens and Brooks Tigner, "Clashing Agendas Threaten European Arms Unity," *Defense News*, 30 March - 05 April 1998, 58.

¹¹⁷ Pamela Pohling-Brown, "NATO procurement reform in doubt after initial findings," *Jane's Defence Contracts*, November 1997, 8.

process and may be scaled back or even eliminated, though the latter outcome seems unlikely.

Despite their original intentions, groups like OCCAR and the CNAD have functioned to re-entrench the current procurement system within Europe by not forcing the larger nations (France, Germany, Great Britain, and Italy) to divest themselves of their nationalistic tendencies that support domestic industries over international cooperation and consolidation. Smaller nations like Spain, Portugal, and Greece are dependent on forums like OCCAR or the CNAD at the subcommittee levels in order to stay abreast of current weapons developments within the larger nations. The United States is a member of the CNAD, but can only persuade its European allies to work together via political means. Moreover, in light of the American military's decision to support the concept of information superiority as a way of leaping ahead into the twenty-first century, several tiers of technology may be on the verge of appearing. Europeans may find that they can not afford the systems that the U.S. will attempt to buy, and thus will be left behind. Some states like Great Britain, Canada, and maybe Germany might be able to follow, but most will not. Different levels of technology may result in different perspectives among Europeans when it comes to participating in future coalition operations and may even threaten the NATO Alliance. Some experts have concluded that "widely differing capabilities between allies in military operations will be divisive both from a military and a political viewpoint."¹¹⁸

¹¹⁸ Speech by Norman Ray, "The Transformation of NATO: Challenges and Perspectives," AFCEA Europe Symposium, Brussels, 17 October 1996, 6.

VIII. CONCLUSIONS

A. SPECIFIC FINDINGS CONCERNING INDUSTRIAL SECTORS

(1) In the area of combat aircraft, regardless of Dassault's success in exporting the Rafale, its successor will have to be designed with other European or American aerospace companies. Despite its recent deals with Dassault involving future R&D efforts, British Aerospace will remain the pivotal aircraft company in Europe in terms of potential for either a possible future merger or as a partner within an alliance aimed at advanced aircraft production. Lockheed Martin's association with British Aerospace within the Joint Strike Fighter program probably will give it the "inside track" among the major European competitors.

(2) In the area of space launchers, Arianespace will continue to maintain a large share of the global space launching business, but its overall proportion of market share may well be reduced by the American EELV programs and the American/Russian joint ventures (ILS and possibly Sealaunch). Arianespace's lack of a small- or medium-sized space launcher will slow its entry into the "constellation" world for satellite orders to provide replacement launching services for systems like Iridium, Teledesic, and Globalstar. Finally, French influence as exerted by CNES in ESA will probably decline as other European nations, such as Italy and Germany, begin to protect their own domestic aerospace industries and to promote the broader European space agenda.

(3) In the area of military space satellites, France will attempt to develop and deploy a European navigational system similar to GPS to reduce dependence on the

United States. France may initiate efforts to increase its autonomy by supplying strategic intelligence to its European allies based on remote sensing imagery from Helios. Frustrations from France's Helios partners and potential customers may, however, increase the likelihood that American commercial satellite programs will gain inroads with these disgruntled nations and customers.

(4) In the area of overall aerospace consolidation, efforts within Europe aimed at utilizing the vehicle of Airbus SCE as a transition element have the potential for future success. The sector-by-sector reorganizing approach has been seen by many Europeans as only offering the potential for a re-entrenched France to continue exerting influence after it first completes its own consolidation efforts aimed at building domestic companies strong enough to compete with the rest of Europe. However, most Europeans, especially the British and the Germans, will insist on maintaining the transatlantic link with the United States so as to continue being a part of current technological alliances with the Americans.

B. GENERAL FINDINGS CONCERNING FRANCE AND EUROPE

Throughout the course of this thesis, several factors concerning how defense procurement has been affected by the role of the French government have been illustrated:

(1) Despite attempts to overcome its competitors through improvements in technology, France has re-discovered that the national control of its procurement process and its defense establishment is domestically important; French political leaders are convinced that these activities must remain under government control.

(2) While other European nations have allowed their defense industries to work with their counterparts abroad, the concept of state ownership of French firms has limited their opportunities for consolidation and capital investment. Consequently, these firms have become tied to subsidies, domestic procurement efforts, and exports in order to survive.

(3) The integration of Europe's defense industries has the prospect of deepening direct competition with the United States. However, France, due to its size and technological prowess, remains the linchpin within any concept aimed at integration.

(4) France will continue to pursue all viable efforts to achieve success in the technological arenas of aerospace and electronics, to the maximum extent possible, based on its resources and innovation.

(5) The development of multiple tiers of technology, due to the American desire to exploit advances in such areas as information technology, will potentially threaten the NATO alliance – or at least cause new strains – if France and other European nations are unable to acquire similar capabilities.

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